

SYSTEM AND METHOD FOR REMOTE EDUCATION USING A MEMORY CARD

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PRIORITY CLAIM

This application is a Continuation of Application Serial No. 09/971,785, filed October 15 4, 2001, which is a Continuation of Application Serial No. 09/119,546 filed July 20, 1998, now U.S. Patent 6,330,426, issued December 11, 2001, which is a Continuation-In-Part of Application Serial No. 08/953,883 filed October 20, 1997, now abandoned, which is a Continuation-In-Part of 08/757,129 filed December 3, 1996, now U.S. Patent No. 6,144,837 issued November 7, 2000, which is a Continuation-In-Part of U.S. Application Serial No. 20 08/334,643 filed on November 4, 1994, now U.S. Patent No. 5,601,435 issued February 11, 1997.

This application is also a Continuation of Application Serial No. 09/119,546 filed July 20, 1998, which is a Continuation of Application Serial No. 08/958,786, filed October 29, 1997, now U.S. Patent 5,913,310, issued June 22, 1999, which is a Continuation-In-Part 25 of Application Serial No. 08/857,187, filed May 15, 1997, now U.S. Patent 5,918,603, issued



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July 6, 1999, which is a Divisional of Application Serial No. 08/247,716, filed May 23, 1994, now U.S. Patent 5,678,571, issued October 21, 1997.

All of the above applications are herein incorporated by reference.

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FIELD OF THE INVENTION

The present invention generally relates to remote education systems. More particularly, this present invention relates to a system and method of remote health education in which an individual is provided with a memory card capable of being placed in a multimedia processor to automatically access selected educational health programs.

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BACKGROUND OF THE INVENTION

One of the biggest problems many healthcare providers face is their patients' lack of knowledge. Patients may lack knowledge on basic preventative measures, such as why they should exercise, eat right, and not smoke. Patients may also lack knowledge on conditions or diseases they do have, such as how to measure their blood glucose levels if they are diabetic.

15 This lack of knowledge is a problem for healthcare providers because patients who do not know how to take care of themselves are ill more frequently. Thus, they must visit their doctors more often, sometimes incurring additional costs for hospital stays or laboratory tests. This results in greater fees for the patient, his or her insurance company, and often the taxpayers.

20 An example of this problem is seen in some diabetes patients. Diabetic patients must regularly receive insulin shots and adhere to a specific diet in order to control their blood glucose levels. Unfortunately, some diabetic patients do not understand all the reasons why they should have regular insulin shots or why they should or should not eat certain foods. In addition, many diabetic patients are unaware of the health consequences should they not 25 follow their treatment plan. As a result, such patients are sicker and require more healthcare



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than those patients who understand all aspects of their diseases. Sicker patients require more healthcare, which is expensive and time-consuming for healthcare professionals, insurance companies, and the patients themselves.

One way this problem is handled is by increasing the amount of education patients receive about their lifestyle choices and/or their diseases. When patients know what they need to do to stay healthy, they are less inclined to visit their doctors as frequently. In addition, if patients understand the health problems that will result from not taking care of themselves, they will be more likely to follow their prescribed treatments.

Educational forms range from pamphlets in a doctor's office to radio announcements to television shows. Paper-based educational material is cheap, easy to produce, and easy to distribute. Unfortunately, pamphlets or articles are limited to words and pictures and are usually quite boring, which makes it unlikely that patients will enjoy and remember reading them. Radio announcements and television shows are more lively and entertaining, but they are broadcast to the general public. Thus they cannot be customized to a particular patient.

Due to technological advances, patients can now be educated using CD-ROMs, the Internet, and multimedia processors. U.S. Patent No. 5,307,263 by the present inventor discloses a modular, microprocessor-based health monitoring system. The hand-held unit has a display screen, a control button pad, interchangeable program cartridges, and sensors for monitoring a variety of healthcare data. The program cartridges include motivational and educational material related to use of the device, including step-by-step instructions. Acquired data may be transmitted to a data management unit via an interface cable, or to a clearing house via telephone lines. A program cartridge for monitoring glucose levels and a glucose sensor is disclosed for the purpose of caring for children with diabetes.

U.S. Patent Nos. 5,597,307 and 5,624,265 by Redford and Stern describe an educational system and apparatus aimed at children which also uses a multimedia processor. This invention comprises a remote control located in a book or other printed publication. A



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child can read the book while watching the display generated by the multimedia processor, and then press the buttons in the remote control book to alter what he sees.

None of the above education systems allow an individual to automatically access assigned educational programs remotely. The inventions described above provide general 5 educational programs which are not tailored to any one individual. Neither system provides confirmation that an individual has completed the educational program. Neither system allows a healthcare provider nor teacher to easily custom-design which educational programs a patient or individual is to view. Finally, neither system provides a patient or individual access to an unlimited number of educational programs.

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Objects and Advantages of the Invention

In view of the above, it is an object of the present invention to provide an individual with a remote education system which can be accessed from the individual's home. It is another object of the invention to provide a remote education system which displays educational programs for an individual. It is another object of the present invention to 15 provide interactive educational programs. Another object of the invention is to provide a remote education system comprising a memory card containing an individual's identification code and the locations of educational programs for the individual to view. It is another object of the present invention to provide confirmation that an individual has completed an educational program. It is another object of the invention to provide a remote education 20 system through the Internet. Yet another object of the present invention is to provide a remote healthcare education system for patients. It is another object of the present invention to allow a healthcare provider to assign educational programs for a patient by using a memory card.

These and other objects and advantages will become more apparent after 25 consideration of the ensuing description and the accompanying drawings.



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SUMMARY OF THE INVENTION

The present invention comprises a system and method for remote education using a memory card. The system preferably comprises a database, a file server, a remote interface, a memory card writer, a display unit, a multimedia processor, and a card reader. The file 5 server acts as a central hub of the system, because it is preferably coupled to the database, the remote interface, and the multimedia processor. Accordingly, these three components are capable of being located at long distance from one another. The database preferably stores a plurality of educational programs. Preferably, the remote interface allows an administrator, such as a healthcare provider or educator, to assign an educational program to an individual.

10 The identification code of the individual and a pointer referring to the assigned educational program are preferably stored on memory means of the file server. Preferably, by using the memory card writer, the administrator is capable of recording the individual's identification code and the address of the file server onto the memory card.

After the administrator assigns the particular educational program to the individual, 15 the memory card can be given to the individual. When the individual wishes to view the assigned educational program, the individual simply places the card in the card reader. Preferably, the memory card reader is coupled to or located with the multimedia processor, which in turn is coupled to the file server. Upon receiving the memory card, the multimedia processor preferably sends the individual's identification code to the file server. Preferably, 20 the file server then calls up the assigned educational program from the database. The content of the educational program is sent to the multimedia processor and displayed on a display unit for the individual.

Preferably, the file server is notified when the individual has completed the educational program. Completion data includes the date and time the individual watched the 25 educational program. Further, the completion data can also include responses made by the



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individual to the educational program. Preferably, the file server records the completion data and then send the completion data to the remote interface for the administrator to review.

In the preferred embodiment of the remote education system, the file server is a web server, the remote interface is an interactive web page, and the communication link is the Internet. An administrator assigns an educational program to the individual by entering the assignment information onto the web page. The assignment information is sent to the web server where it is held. When the individual places the memory card into the card reader, the multimedia processor sends the individual's identification code to the web server, which calls up the educational program from the database. In the preferred embodiment, the database can comprise one or more web servers, which allows the administrator to assign to the individual an unlimited amount of material.

In the preferred embodiment, the memory card is a plastic card with a magnetic information strip, similar to an ordinary credit card. The magnetic strip contains the individual's identification code and the location of the file server. In another embodiment, the memory card comprises a circuit. The circuit contains the individual's identification code and the location of the file server.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred and alternative embodiments of the present invention are described in detail below with reference to the following drawings.

Fig. 1 is a schematic diagram of a remote education system according to a preferred embodiment of the present invention;

Fig. 2 is a block diagram showing the components of the remote education system and how they are connected, according to Fig. 1;

Fig. 3 is a sample program assignment screen as displayed on the remote interface;

Fig. 4 is a sample report screen as displayed on the remote interface;



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Fig. 5 is a sample interactive educational program as displayed by the multimedia processor;

Fig. 6A is a flow chart illustrating the steps executed by the file server of the present invention as shown in Fig. 1;

5 Fig. 6B is a continuation of the flow chart of Fig. 5A, and

Fig. 7 is a flow chart illustrating the steps executed by the multimedia processor of the present invention as shown in Fig. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention provides a system and method for remotely educating an
10 individual using a memory card. In the preferred embodiment, the invention is used to distribute custom-designed health education programs to patients. However, it is to be understood that the invention is not limited to the healthcare industry. The system and method of the invention may be used for any type of remote education application in any field.

15 The preferred embodiment of the system is shown in Fig. 1. The system 110 comprises a file server 112, which is connected by communication links 138, 130, and 140 to a remote interface 114, a database 148 containing educational programs, and a multimedia processor 124. File server 112 is preferably a world wide web server, remote interface 114 is preferably a web page, and communication links 138 and 130 are preferably the Internet.
20 Remote interface 114 has a display 116 and a keyboard 120, which an administrator can use to assign an educational program to an individual.

Remote interface 114 also contains or is connected to a memory card writer 118. Memory card writer 118 is used to record the individual's identification code and the location of file server 118 on a memory card 118. Preferably, the location of file server 118 is in the
25 form of a uniform resource locator, or URL.



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Communication link 140 from file server 112 to multimedia processor 124 is preferably the Internet. However, file server 112 and multimedia processor 124 can also contact each other via wireless communication networks, cellular networks, telephone networks, or any other suitable network. Multimedia processor 124 is also connected by 5 communication link 132 to a display 128, which is used to show educational programs to the individual. Communication link 132 can be any suitable connection means. Display 128 is a standard audiovisual display, such as a television.

Multimedia processor 124 contains or is connected to a memory card reader 126. When memory card 118 is placed in memory card reader 126, the assignment information is 10 sent to file server 112, which retrieves the assigned educational program from database 148. The educational program content is then sent through communication link 40 to multimedia processor 124 and shown on display 128. In addition, microprocessor 124 can also comprise expansion ports to support additional user interfaces and devices, such as keyboards and trackballs, as well as add-on circuits for enhanced sound, video, or processing performance 15 (not shown).

As shown in Fig. 3, input device 134 comprising numerous momentary contact push buttons 136 is used by the individual to control and respond to the educational program. Push buttons 136 represent control functions, such as "on" and "off", as well as numbers, letters, or various commands, such as "yes" and "no". Alternatively, push buttons 136 may 20 be replaced by switches, keys, a touch sensitive display screen, or any other data input device. Input device 134 is a standard wireless communication means which sends command signals to multimedia processor 124 to be processed and executed. However, any communication means which allows input device 134 to connect with multimedia processor 124.

25 For clarity of illustration, only one database and only one multimedia processor are shown in Fig. 1. It is to be understood that system 110 may include any number of databases



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for storing any number of educational programs, and any number of multimedia processors for use by any number of individuals.

Fig. 2 shows a detailed block diagram of the preferred embodiment of the invention illustrated in Fig. 1. Server 112 includes a general software application 142 which is used 5 to create a database 144 and a patient table 146. Software application 142 is also capable of programming file server 112 to carry out standard commands such as receiving, saving, and transmitting information. Database 144 contains the educational programs 148. Alternatively, database 144 can contain pointers to educational programs 148 which are located in remote databases. The advantage of the pointers is that they allow the healthcare 10 provider to assign any number of educational programs 148, as long as educational programs 148 can be transmitted to multimedia processor 124 and shown on display 28. Thus suitable forms of educational programs 148 include photos, videos, animation, static web pages, interactive web pages, etc. Patient table 146, which is stored in the memory of file server 112, lists the patients, their identification codes, and educational programs 148 which have 15 been assigned to them.

Patient table 146 is generated by information entered into the assignment screen 150 of remote interface 114. Assignment screen 150, which is illustrated in Fig. 3, lists available educational programs 148, each with a corresponding check box 166, and patients, also each with a corresponding check box 168. The administrator brings up assignment screen 150 on 20 display 116 of remote interface 114. She selects a check box 168 for a patient and then selects a check box 166 corresponding to educational program 148 to be assigned to the patient. More than one educational program 148 can be assigned to each patient. In addition, more than one patient can be assigned the same educational program 148. The administrator then selects the ASSIGN PROGRAM button 70, which stores the assignment 25 in patient table 146. Assignment screen 150 also includes a DELETE PROGRAM button 72, which allows the administrator to erase the assignment.



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New listings of patients and educational programs 148 can easily be created by the administrator by clicking on the ADD NEW PATIENT button 174 or the ADD NEW PROGRAM button 176. When these buttons are selected, a new field is added to the patient or program categories. The administrator then types in the name of the new patient or the 5 name of the new educational program 148, and saves the addition by clicking on the SAVE NEW LISTING button 178. The new listings are then saved in patient table 146.

In the preferred embodiment, remote interface 114 is a web page. Thus, using keyboard 120, as shown in Fig. 1, the administrator can create customized educational programs 148 in the form of static or interactive web pages for patients. The administrator 10 creates the web page using a scripting language such as HTML or Java, and then stores it on database 144. These web pages can be accessed by multimedia processor 124 in the same manner as the above mentioned educational programs 148.

Referring to Fig. 2 again, remote interface 114 also comprises a report screen 152 which is shown on display 116. Report screen 152, as illustrated in Fig. 4, tells the 15 administrator when the patient has completed watching assigned educational program 148 and/or a program score. Specific techniques for writing report generator program to display data in this manner are well known in the art.

The program score is generally determined by evaluating the patient's responses to an interactive educational program, such as an interactive web page. Fig. 5 shows a sample 20 educational program 148 which includes questions for the patient to answer using input device 134.

The remote education system also includes a memory card writer 18 connected to remote interface 114. Memory card writer is an apparatus which can encode information onto a magnetic strip or circuit. The process of storing information on a magnetic strip or 25 circuit is well known. Memory card 122 produced contains the patient's identification code 156 and the file server address 154.



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As shown in Fig. 2, multimedia processor 124 also comprises a memory means 160, a central computing unit (CPU) 158, a modem 164, and audiovisual display 128. Memory card reader 126, memory means 160, modem 164, and audiovisual display 128 are all connected to CPU 158. Multimedia processor 124 connects to file server 112 using modem 164 and 5 communication link 40, which is preferably a telephone cable. Multimedia processor 124 can be programmed to automatically dial out using modem 164 whenever memory card 122 is placed in memory card reader 126.

Memory card reader 126 comprises means of detecting and interpreting the information stored on memory card 122. In the preferred embodiment, memory card reader 10 126 is a magnetic strip reader. When the patient places memory card 122 in memory card reader 122, the information is sent to CPU 150 and then memory means 160. The information is then sent to file server 112 by way of modem 164.

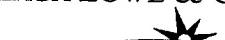
Memory means 160 of multimedia processor 124 is also for storing program instructions on how to connect to file server 112 and how to transmit patient's identification 15 code 156. In addition, memory means 160 receives and stores assigned educational programs 148 from file server 112. When the content of educational programs 148 are sent to multimedia processor 124 from file server 112, memory means translate the content into audiovisual signals to be displayed on display 128.

Figs. 6A and 6B show a flowchart illustrating the steps carried out by server 112 in 20 the preferred embodiment of the invention. In step 202, server 112 first asks if the administrator would like to create a new assignment. Creating a new assignment can mean adding a new patient to the patient list or assigning a new educational program 148 to a patient. If the administrator decides to create a new assignment, the information is stored in patent table 146, as shown in step 204. In step 206, the new assignment information 25 consisting of the patient's identification code 156 and file server address 154 is also recorded on memory card 122 by memory card writer 118, and then given to the patient. If the



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administrator does not need to create a new assignment, she goes directly from step 202 to step 208.

After the patient returns home, he places memory card 122 in memory card reader 126 connected to multimedia processor 124. File server address 154 on memory card 122 5 allows multimedia processor 124 to locate and connect to file server 112 in step 208. Patient's identification code 156 is then sent over in step 210. In step 212, file server 112 then goes to patient table 146 and looks up educational program 148 assigned to patient. A pointer in database 144 then retrieves educational program 148. If educational program 148 is located in a remote database, it is sent through file server 112 to multimedia processor 124, 10 as shown in step 214. Memory means 160 of multimedia processor 124 then interpret and translate the content of educational program 148 into audiovisual signals to be shown on display 128.

After the patient has watched educational program 148, completion data comprising the time and date or patient responses is sent from multimedia processor 124 to file server 15 112 in step 216. Step 218 scores the patient responses to determine a program score. Step 220 then records the completion data in patient table 146 of file server 112.

If the administrator wishes to view completion data of a particular patient, she can request a patient report, as shown in step 222. Step 222 can occur after the patient has watched and responded to educational program 148 in step 220, or at any time after step 208. 20 File server 122 retrieves the patient's completion data from patient table 146, step 224, and then shows it in the form of report screen 152 on display 116 in step 226. Report screen 152 is illustrated in Fig. 4.

Fig. 7 is a flowchart outlining the steps involved in the processor program of multimedia processor 124 in the preferred embodiment of the invention. Processor program 25 can be carried out by known software programs. The processor program begins when memory card 122 is placed in memory card reader 126, as shown in step 302. Memory card



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reader 126 reads patient's identification code 304 and file server address 156 from memory card 122 in step 304, and then sends the information to CPU 158. File server address 156 allows CPU 158 to connect to server 112 via modem 164 in step 306. Patient's identification code 154 is then transmitted to file server 112 in step 308. In step 310, CPU 158 receives the
5 content of assigned educational program 148 via modem 164. The content is converted into audiovisual signals shown on display 128 in step 312. Patient response to educational program 148 is sent to CPU 158 by input device 134. CPU 158 then sends the patient response, along with other completion data, to file server 112. The processor program of multimedia processor 124 then ends.

10 Memory card reader 126 of multimedia processor 124 can also have a writing function similar to that of memory card writer 118 of remote interface 114. This feature allows the patient responses to educational program to be stored on memory card 122. The patient can then bring in memory card 122 to his healthcare provider or the administrator. Memory card writer 118 of remote interface 114 must also have reading capabilities.
15 Memory card 122 is inserted in memory card writer/reader 118 and the patient responses are downloaded into remote interface 114. This feature can be used if the patient does not wish to transmit his responses over communication link 140.

The present invention allows a healthcare provider or administrator to assign a remote educational program to a patient. The patient has the luxury of watching and responding to
20 the program in his own home at his convenience. The patient's response to the educational program is then transmitted to the file server and displayed for the administrator to view. Thus the administrator can monitor whether or not the patient has watched the educational program, and can also evaluate his responses to the program.

Appendix A shows one implementation of the present invention as it applies to
25 working with a diabetes patient through MEDTV™ over the Internet. MEDTV™ is a trademark of Raya Systems, Inc. (Mountain View, California).



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SUMMARY, RAMIFICATIONS, AND SCOPE

Although the above description contains many specificities, these should not be construed as limitations on the scope of the invention but merely as illustrations of some of 5 the presently preferred embodiments. Many other embodiments of the invention are possible, as this invention can be used in any field where it is desirable to remotely educate an individual. For example, teachers can use it to assign lessons to their students, and employers can use it to provide additional job training for their employees.

Another embodiment of the present invention allows companies to promote their 10 products. Preprogrammed memory cards can be placed with a company's products. When the consumer buys a product, he also receives the preprogrammed memory card, which contains the product identification code and the address of the company's consumer-product file server. When the consumer places the memory card in the memory card reader of his multimedia processor, the multimedia processor automatically connects to the company's file 15 server. The file server contains a consumer-product table which stores a list of all the company's products with corresponding pointers to relevant educational programs or advertisements. For example, a sunblock product would have a pointer to a short video on basic sun safety, as well as an advertisement for all sunblock products made by that company.

When the file server receives the product identification code from the multimedia 20 processor, it retrieves the relevant educational program or advertisement and sends it back to the consumer's multimedia processor. The consumer can then watch the program or advertisement on the display.

Considering all the possibilities of the remote education system, the scope of the 25 invention should be determined not by the examples given, but by the appended claims and their legal equivalents.



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